

What is claimed is:

1. A system for effectively deploying a safety restraint cushion,
comprising:

5 (a) an inflatable airbag, said inflatable airbag being adapted for
deployment into a deployment region within the interior of a vehicle, said
inflatable airbag further having a leading edge configured for impact with
a person, said leading edge comprising a conductive material;

(b) an electromagnetic field generating device, said device being
10 adapted for generating an electromagnetic field within said deployment
region;

(c) a sensing device, said sensing device being adapted for
detecting the presence within said deployment region of said conductive
material; and

15 (d) a control system adapted for receiving signals from said
sensing device and in response sending feedback signals in real time,
said feedback signals being configured for altering the characteristics of
the deployment of said inflatable airbag.

20 2. The system of claim 1 wherein said system further comprises
an inflation device, said inflation device being adapted for emitting gas
into said airbag to inflate and thereby deploy said airbag into said
deployment region, further wherein said control system is adapted for

sending said feedback signals to said inflation device in controlling the deployment of said inflatable airbag.

3. The system of claim 2 wherein said inflation device is adapted
5 for releasing gas to a gas bypass pathway upon receiving said feedback signals.

4. The system of claim 1 wherein said system further comprises
an inflation device, said inflation device being adapted for emitting gas
10 into said airbag in a primary gas charge and at least one supplemental gas charge, wherein said inflation device is adapted for receiving feedback signals from said control system to inactivate said supplemental gas charge.

15 5. A system for providing a real time reduction in applied force of a safety restraint cushion for an automobile, comprising:

(a) an inflatable airbag, said inflatable airbag being adapted for receiving gas from an inflation device to accommodate expansion of said airbag into a deployment region within the interior of an automobile, said
20 inflatable airbag further comprising a textile, wherein said textile comprises a leading edge that extends into said deployment region upon inflation of said airbag, said leading edge of said textile further comprising conductive material, wherein said conductive material is

configured for generating an electromagnetic response when passing through an electromagnetic field;

(b) an electromagnetic field generating device, said device being mounted in the interior of said automobile, said electromagnetic field
5 generating device being adapted for generating an electromagnetic field within said deployment region in the interior of said automobile;

(c) an electromagnetic sensing device, said sensing device being adapted for detecting the presence and relative position within said deployment region of said conductive material; and

10 (d) a control system configured for receiving signals from said sensing device and in response dispatching feedback signals in real time during said deployment of said airbag, said feedback signals being configured for reducing the force applied by said leading edge of said airbag.

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6. An inflatable airbag comprising a woven fabric, said fabric comprising a leading edge adapted for extending into the interior of a vehicle during inflation of said airbag, said woven fabric further comprising a conductive material capable of exhibiting an
20 electromagnetic response in the presence of an electromagnetic field.

7. The inflatable airbag of claim 6 wherein said conductive material comprises fibers interwoven into said fabric of said airbag.

8. The inflatable airbag of claim 7 wherein said fibers comprise a metallic filament.

5 9. The airbag of claim 7 wherein said fibers include conductive polymeric material.

10 10. The inflatable airbag of claim 6 wherein said conductive material is applied as a coating to said leading edge of said fabric.

11. The airbag of claim 10 wherein said conductive material comprises a metallic material.

12. The inflatable airbag of claim 6 wherein said conductive
15 material comprises at least one RF resonator integrally formed or coated into said leading edge of said fabric.

13. The inflatable airbag of claim 12 wherein said conductive
material comprises at least two RF resonators integrally formed into said
20 leading edge of said fabric.

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14. A method of altering the deployment positioning of an inflatable airbag during deployment of the airbag in response to the detected position of objects or out-of-position passengers in the pathway
5 of the airbag, said method comprising:

(a) providing an inflatable airbag, said airbag comprising an inflation mechanism for deploying a fabric, said fabric having a leading edge, said leading edge comprising an electromagnetically conductive material;

10 (b) providing an electromagnetic field generating device and a control system;

(c) generating an electromagnetic field in the vicinity of said airbag;

(d) deploying said airbag into said electromagnetic field;

15 (e) electromagnetically sensing the presence in said electromagnetic field of said conductive material of said leading edge of said airbag, and determining the position of said conductive material upon said leading edge of said airbag at more than one point in time to determine the characteristics of motion of said airbag during deployment;

20 (f) comparing the characteristics of step (e) with predetermined ranges or values to detect if objects are present in the pathway of said airbag; and

(g) sending feedback signals to said control mechanism, and

(h) altering the conditions for deployment for said airbag in response to said detected objects.

15 15. The method of claim 14 wherein said characteristics of motion of said airbag which are determined in step (e) include values of the relative velocity of the leading edge of said airbag during deployment.

16. The method of claim 14 wherein said characteristics of motion of said airbag which are determined in step (e) include values of
10 the acceleration of said airbag during deployment.

17. The method of claim 14 wherein said feedback signals alter the inflation mechanism by opening a gas flow bypass port.

15 18. The method of claim 14 wherein said electromagnetically conductive material in step (a) comprises metallic fibers.

19. The method of claim 18 wherein said metallic fibers are woven into said fabric of said airbag.

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20. The method of claim 14 wherein said electromagnetically conductive material comprises an conductive coating.

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21. The method of claim 14 wherein said electromagnetically
conductive material comprises a resonator.